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Characterization after neutron irradiation of Silicon Diodes for the CMS High Granular Calorimeter (HGCAL)

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The CMS collaboration is planning to upgrade the forward calorimeters as these will not be sufficiently performant with the expected HL-LHC (High Luminosity LHC) conditions. One of the proposed calorimeter options is the High Granularity Calorimeter (HGC). It is realized as a sampling calorimeter with layers of silicon detectors that feature very high longitudinal and lateral granularities and a coarser segmentation backing hadronic calorimeter based on scintillators as active material. For the electromagnetic calorimeter (EE) 420m2 of silicon detectors and for the Front Hadronic calorimeter (FH) 250m2 of silicon detectors with a total of 5.1M channels are anticipated. The sensors are realized as pad detectors of a size in the order of 1 cm2 with an active thickness between 100 and 300 um depending on the position respectively the expected radiation levels. We present our first results after irradiation of 300μ , 200μ and 100μ n-on-p and p-on-n devices that have been made up to fluxes of 1.5E16 n/cm2 at Ljubljana and have been measured at Hamburg.

Author: CURRAS RIVERA, Esteban (Universidad de Cantabria (ES))
Presenter: CURRAS RIVERA, Esteban (Universidad de Cantabria (ES))
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